



## LIGHTING CONTROL SYSTEM WITH VARIABLE ARC CONTROL INCLUDING START-UP CIRCUIT FOR PROVIDING A BIAS VOLTAGE SUPPLY

### Field of Invention

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**[0001]** The present invention relates to lighting control systems and, more particularly, relates to a control system for providing variable arc current to one or more fluorescent lamps, including an improved start-up circuit for providing a bias voltage supply to various system components. This application is a continuation of serial no. 10/197,836 filed 07/09/2002, now Pat. 6,724,152.

### Background of the Invention

**[0002]** Fluorescent lamps are gas discharge lamps that are based on Hg vapor which, when excited, provides a low intensity spectral line of visible light and several high intensity lines of ultra-violet light, that are converted to visible light by the phosphor coating on the interior surface of the lamps. Fluorescent lamps were perfected as an alternative to incandescent lamps, and have since replaced the incandescent lamps in most commercial and industrial applications. The fluorescent lamp has a substantially longer life than the incandescent lamp which results in reduced maintenance costs. The fluorescent lamp also provides a more distributive light source which is two to six times more efficient than incandescent lighting in terms of luminous flux per unit of electric power consumed.

**[0003]** Since the fluorescent lamp has no inherent current limiting mechanism when operated by a voltage source, the fluorescent lamp requires an auxiliary device to first ignite the lamp arc and then, after ignition has occurred, to control the amplitude of the arc current. Without an auxiliary device to stabilize or limit the arc current, the lamp arc would exceed its current rating and thus, the fluorescent lamp would be damaged. In conventional systems the auxiliary device has been combined into a single device called a ballast. The ballast provides a means for igniting the lamp arc and also provides a fixed value of arc current to the lamps. A shortcoming of the fixed value of arc current lighting is that it wastes energy. Underlighted conditions are often due to light absorbing dust on the lamp and the deterioration of the phosphor coating on the inside wall of the fluorescent tube. To reduce the effect of the underlighted conditions, designers overlight the area when the lamps are new and lamina are